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(54) Title: WEB RETENTION APPARATUS AND METHOD FOR CUTOFF BLADE

(57) Abstract: A web retention apparatus and method for securing the edge of a severed web against movement or piling up during subsequent web operations. The invention preferably utilizes a vacuum aperture which draws in and holds a portion (e.g., the edge) of a web which has been severed. The vacuum aperture is connected to a vacuum generator which creates a suction force pulling the web portion into and holding it within the vacuum aperture. For this purpose, the aperture is preferably an elongated groove or slot located near the position at which the web is cut, thereby permitting the web portion to lie near and be pulled into the vacuum aperture. The aperture can have a throat defined by one or more walls extending below the surface in which the aperture is located. The present invention finds particular applicability on a cutoff roll, where one or more cutoff blades are mounted on a cutoff roll surface. In such a system, the vacuum aperture preferably runs alongside and behind the cutoff blade and pulls (via suction through the vacuum aperture) the portion of the severed web into the vacuum aperture after the web has been cut by the cutoff blade. In other embodiments of the invention, the vacuum aperture can be located in front of the cutoff blade to secure that part of the severed web which lies in front of the cutoff blade. In fact, a vacuum aperture can be located on both sides of the cutoff blade if desired.

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WEB RETENTION APPARATUS AND METHOD FOR CUTOFF BLADE

Field of the Invention

The present invention relates to systems and methods for securing product to machine surfaces, and more specifically, to apparatus and methods for securing material to a machine surface (such as a roll) during and after cutting operations of the material on the machine surface.

Background of the Invention

Material cutting is a common operation performed in many industries, including the paper, textile, plastics, synthetics, and foil industries. Particularly where material is in sheet or flat form, a preferred manner employs one or more rolls around which the material is passed as it is transversely cut. Certain conventional cutting systems have a cutoff roll with one or more surface blades thereon. Material is fed around the rotating cutoff roll, and the material is usually either pinched or sheared between a surface blade and an anvil blade in close proximity to the cutoff roll. Because the demand for processed product is usually high, the speed at which the cutoff roll rotates and at which the material moves is also high. However, because certain materials are inherently difficult to manipulate and control (especially at relatively high material speeds), a number of systems and methods have been developed for releasably holding material to the surface of the cutoff roll as the material is pulled around the rotating cutoff roll.

One such conventional system employs a vacuum system for the cutoff roll. In this system, a number of holes are located on the exterior surface of the cutoff roll. Vacuum applied to the roll in a manner well-known to those skilled in the art generates a suction through the holes, thereby holding the material against the surface of the roll. By controlling the application of vacuum to selected areas of the roll, conventional systems can be operated to hold or release the material at desired times or at particular cutoff roll rotational positions. While these systems are effective at releasably holding

the material, a problem arises in those locations on the cutoff roll which are near the cutoff blades on the roll. As shown in Figure 1, material 1 is cut by shearing between the cutoff blade 2 on the cutoff roll 3 (which rotates in the direction of arrow A) and a nearby stationary anvil blade 4. This cutting produces a trailing edge 5 and a leading edge 6 of the cut material 1. For proper material control and manipulation in later operations, the leading edge 6 of the material 1 must be held in place on the cutoff roll 3. If desired, even greater material control and improved manipulation ability can be achieved by holding both the leading edge 6 and the trailing edge 5 of the cut material 1 in place on the cutoff roll 3.

As will be appreciated by those skilled in the art, if the leading edge 6 is not held in place on the cutoff roll 3, the material 1 can "pile up" and even cause jams in downstream operations. The leading edge 6 of the cut material 1 is particularly prone to piling up behind the severing blade 2. Prior art systems have attempted to address this problem in a variety of different ways. Perhaps the most commonly found solution is to locate one or more vacuum holes 7 beneath a leading portion or end of the cut material 1. An example of a system employing such a design is disclosed in U.S. Patent Number 3,709,088 issued to Trogan et al. Also, U.S. Patent numbers 4,041,816 and 4,080,856 issued to Shearon show a system having two rows of vacuum holes behind the cutoff blade for holding the leading end of severed material. While such systems may be effective to hold severed material ends in place on a cutoff roll, their design presents limitations which the present invention addresses. Specifically, in the design of the conventional systems using vacuum holes to hold severed material ends, the systems invariably rely upon the vacuum holes to hold the face of the material near the severed ends. Because the material can slip on the cutoff roll and may not fall exactly in the desired locations over the vacuum holes after being cut, the prior art designs are not

always effective to prevent piling up of the material ends (and especially the leading end of the severed material as shown in Figure 1) near the cutoff blades. Also, the prior art designs are inherently limited to operations upon certain types of material. For example, the systems disclosed in the Trogan et al. and Shearon patents noted above often work poorly with multi-ply materials, where the vacuum holes exert a high holding force on the nearest material ply, but exert a progressively lower holding force on overlying plies. Also, these systems can completely fail to work with very porous material (which is not very subject to force by vacuum) or with materials having a ply with very low porosity underlying one or more other plies (which other plies are effectively shielded from the vacuum force by the low porosity ply).

Therefore, a need exists for an apparatus and method which can releasably secure the severed ends of material to a roll to prevent the ends from piling up and jamming downstream equipment and operations, which works well with material of virtually any porosity, and which can effectively hold all plies of multi-ply material to the roll. Each preferred embodiment of the present invention achieves one or more of these results.

Summary of the Invention

In the present invention, material which has been cut by, for example, a cutoff blade on a cutoff roll is held to the surface of the cutoff roll on either or both sides of the cutoff blade by a web attraction device. The web attraction device can take a number of forms, each of which hold the severed end(s) of the material to the cutoff roll surface following the cutting operation. The web attraction device exerts an web attraction force created by an attraction generator. A preferred web attraction device is a vacuum aperture preferably running along at least a portion of the length of the cutoff

roll and on one or both sides of the cutoff blade. Preferably, the vacuum aperture is in the shape of an elongated groove or slot running immediately behind the cutoff blade. More preferably, the vacuum aperture runs substantially the entire length of the cutoff roll behind the cutoff blade. Most preferably, the vacuum aperture is shaped and positioned behind the cutoff blade to receive the leading edge of the severed material after it has been cut by the cutoff blade. All plies of the leading edge are preferably pulled down into the vacuum aperture rather than merely being held in place on the roll surface by vacuum holes.

In this manner, and unlike the prior art devices and systems, the present invention holds the ends of the cut material better by pulling the edge or edges of the cut material into one or more vacuum apertures. Also, all plies of multi-ply materials are thereby secured, and even highly porous materials and multi-ply materials having a very low porosity ply are fully held to the roll. The present invention thus ensures that more material types are better secured in place to prevent material pile-ups and potential jamming problems in downstream operations.

More information and a better understanding of the present invention can be achieved by reference to the following drawings and detailed description.

Brief Description of the Drawings

The present invention is further described with reference to the accompanying drawings, which show preferred embodiments of the present invention. However, it should be noted that the invention as disclosed in the accompanying drawings is illustrated by way of example only. The various elements and combinations of elements described below and illustrated in the drawings can be arranged and organized differently to result in embodiments which are still within the spirit and scope of the present invention.

In the drawings, wherein like reference numerals indicate like parts:

FIG. 1 is a cross-sectional view of a prior art web retention apparatus for a cutoff roll;

FIG. 2 is a cross-sectional view of the web retention apparatus according to a first preferred embodiment of the present invention; and

FIG. 3 is a cross-sectional view of the web retention apparatus according to a second preferred embodiment of the present invention.

Detailed Description of Preferred Embodiments

A preferred embodiment of the present invention is illustrated in Figure 2, which shows the stage of material cutting operations after a sheet of material 10 has been severed. The present invention finds particular applicability to cutting operations performed upon sheets of paper (such paper used for tissues, toilet paper, napkins, paper towels, etc.). However, it should be noted that the present invention also finds applicability in a number of other industries in which cutting operations are performed upon virtually any type of material which can be found in sheet form. Such materials commonly include other paper types, plastic sheeting and the like, and even include cloth, fabrics, textiles, films, rubber and other synthetic materials, foils, etc. Therefore, although reference throughout this specification and claims is made to a "web" of paper product (the term "web" commonly referring to paper product in sheet form such as toilet paper or napkin stock), the term "web" is used herein to refer to any material in sheet form regardless of porosity, method of manufacture, or composition, including without limitation paper and paper by-products, cloth, fabric, textiles, foils, films, rubber and other synthetic materials, etc.

Web 10 is shown held against the surface 12 of a cutoff roll 14, which itself is mounted for rotation near a stationary anvil 16. Herein, it is to be understood that the

"surface" 12 of the cutoff roll 14 is the outer surface of the cutoff roll 14 in one highly preferred embodiment (which surface can be interrupted by one or more blades or apertures as described below). It will be appreciated by one having ordinary skill in the art that the web 10 is severed as it is rotated by turning the cutoff roll 14 past the stationary anvil 16. The stationary anvil 16 has an anvil blade 18 which preferably is in light interference contact with a cutoff blade 20 mounted in a conventional manner on the cutoff roll 14. As the cutoff blade 20 passes the anvil blade 18, the web 10 on the surface 12 of the cutoff roll 14 is severed between the cutoff blade 20 and the anvil blade 18. The areas of the severed web 22, 24 which are remote from the cutoff blade 20 are preferably held against the surface of the cutoff roll 14 in a conventional manner (e.g., via vacuum holes in the cutoff roll 14, not shown). However, it is possible to secure the web material upon the cutoff roll 14 by only holding the web 10 to the cutoff roll 14 behind the cutoff blade 20 in a manner as described below, with the web material following behind under a light tension around at least a portion of the cutoff roll 14.

After being severed by the cutoff blade 20, a leading web edge 26 and a trailing web edge 28 are defined in the web 10 - one on either side of the cutoff blade 20. The web edges 26, 28 are now free to move with respect to the cutoff roll 14. Generally, only the leading web edge 26 has a tendency to move or gather on top of the cutoff roll 14 due to the rotational direction of the cutoff roll 14. Therefore, the present invention finds particular applicability to the area behind the cutoff blade 20. However, it should be noted that the present invention also can be useful in locations in front of the cutoff blade 20 (as described below).

In the first preferred embodiment of the present invention illustrated in Figure 2, the cutoff roll 14 has a web retention device (indicated generally at 40) behind the

cutoff blade 20. The web retention device 40 has an aperture 30 preferably in the shape of an elongated groove or slot which preferably runs substantially the entire length of the cutoff roll 14 behind the cutoff blade 20. Although separate apertures running only a small percentage of the length of the cutoff roll 14 can be used, the aperture 30 is preferably uninterrupted along its length. However, interruptions in the aperture 30 are possible without significantly affecting the performance of the present invention. The aperture 30 is preferably shaped and sized to receive the leading web edge 26, and preferably has walls 32, 34 defining a throat 36 of the aperture 30. As such, an uninterrupted aperture 30 is preferred because it permits easier reception of the leading web edge 26 into the aperture 30 (though even an interrupted elongated aperture 30 will still permit lengths of the leading web edge 26 to be pulled into the aperture 30 in accordance with the present invention as described below). It will be appreciated that the particular dimensions and arrangement of the throat 36 and walls 32, 34 can vary considerably. For example, the walls 32, 34 can be closer or farther apart to result in apertures 30 of different widths. In the preferred embodiment of the present invention, the walls 32, 34 preferably substantially face one another to define the sides of the groove-shaped aperture 30. Also, the thickness of the walls 32, 34 need not be of any particular dimension for proper operation of the invention. The walls 32, 34 can be relatively deep, or can be shallow enough that they are defined only by the edges of the aperture 30. Indeed, the dimensions and configuration of the throat 36 and the walls 32, 34 are only dictated by the ability of the aperture 30 and the throat 36 to receive the leading web edge 26. Similarly, the depth of the aperture 30 can vary considerably, and is preferably at least deep enough to receive the leading web edge 26 of the severed web 10 without creating an excess of material at the mouth 38 of the aperture 30.

A vacuum source is in communication with the cutoff roll 14 and is preferably created in a conventional manner by a vacuum generator (not shown), but can instead be supplied by a vacuum tank or other receptacle capable of holding a vacuum. The vacuum source is in communication with the aperture 30 to exert a suction force through the aperture 30. The web retention device 40 (which includes the vacuum generator, the aperture 30, throat 36, walls 32, 34, and mouth 38) thereby holds the leading web edge 26 on the cutoff roll 14. Specifically, the leading web edge 26 is drawn into the aperture 30 after the web 10 has been severed. In this manner, even if the web 10 has multiple plies, has one or more non-porous plies which underlie other plies, or is highly porous, all plies of the leading web edge 26 are drawn into the aperture 30 of the web retention device 40 by the suction created in the cutoff roll 14. This is in contrast to the prior art systems which relied upon suction against the face of the web 10 to hold the web 10 on the cutoff roll 14. In contrast to the present invention, the holding effectiveness of such prior art systems is necessarily dependent upon the web and ply materials being held.

After the leading edge 26 of the web 10 has been pulled into the aperture 30 of the web retention device 40, the leading edge 26 can be held therein until such time as the web 10 is pulled or released from the cutoff roll 14 for later operations performed upon the web 10. By holding the leading edge 26 within the web retention device 40 in the manner described above, the web 10 is kept flat and secure even up to the leading edge 26 of the severed web 10, thereby avoiding web pile-ups and undesirable web edge movement after cutting.

A second preferred embodiment of the present invention is illustrated in Figure 3. The apparatus of the second preferred embodiment is substantially the same as the first preferred embodiment described above and illustrated in Figure 2, with the

exception of the location of the web retention device 140 (specifically, the location of the aperture 130 of the retention device 140). While the aperture 30 of the first preferred embodiment has walls 32, 34 defining the throat 36 of the aperture 30, the throat 136 in the second preferred embodiment is defined by wall 132 and the rear surface 142 of the cutoff blade 120. In other words, the web retention device 140 and the aperture 130 thereof are located immediately behind and are partially defined by the cutoff blade 120. The apparatus illustrated in Figure 3 serves to illustrate how the present invention can take a variety of forms all of which act to receive the leading edge 26, 126 of a severed web 10, 110 into the aperture 30, 130 of a web retention device 40, 140 to more reliably and securely hold the severed web 10, 110 against motion and/or piling up behind the cutoff blade 20, 120.

It should be noted that in the embodiments of the present invention described herein and illustrated in the figures, although it is preferred that the leading edge 26, 126 of the severed web 10, 110 is received within the aperture and held therein by the vacuum force, an aperture located immediately behind the cutoff blade 20, 120 is itself unique and (with sufficient vacuum force) can hold the severed edge 26, 126 to the cutoff roll 14, 114. Therefore, the present invention can also be practiced by locating the retention device 40, 140 immediately behind (or in front of as will be discussed below) the cutoff blade to hold the severed edges of the web 10, 110 securely against the cutoff roll 14, 114 without actually drawing in the severed edges 26, 126 within the aperture 30, 130.

Although the preferred embodiments of the present invention each employ an aperture 30, 130 connected to a vacuum generator to draw the severed edges 26, 126 of the web 10, 110 into the aperture 30, 130, a vacuum generator is only one type of web attraction device that can be used to achieve this result. For example, it is possible to

use electrostatic force to attract the severed edges 26, 126 of the web 10, 110 into the aperture 30, 130 or against the cutoff roll 14, 114 beside the cutoff blade 20, 120. Specifically, one or more surfaces of the cutoff roll 14, 114 near the cutoff blade 20, 120 (e.g., one or more walls 32, 132, 34 of the aperture throat 36, 136, and/or part of the cutoff blade surface 12, 112 beside the cutoff blade 20, 120) can be made of a material capable of retaining an electric charge. When one such surface is used, the surface preferably extends substantially the entire length of the cutoff roll 14, 114 behind the cutoff blade 20, 120. Alternately, multiple charge surfaces can be used, each separated from one another along the length of the cutoff roll 14, 114. The charge surface(s) can be electrically insulated to prevent charge drain and charge bleeding to other parts of the cutoff roll 14, 114. The surface(s) can be connected to an electrostatic generator which generates a charge on the surface(s) at controlled times to attract and repel the severed edges 26, 126 to and away from the cutoff roll 14, 114, respectively. It will be appreciated by one having ordinary skill in the art that the changes in charge created upon the surface(s) of the cutoff roll 14, 114 can be created at particular angular positions of the cutoff roll 14, 114 during its rotation or can be created at desired time intervals depending at least in part upon the speed of the cutoff roll 14, 114. Such a controller for performing these timed or orientation-specific operations can be purely mechanical (e.g., electrical contacts maintaining current only in certain angles of the cutoff roll 14, 114, etc.) or can controlled electronically (e.g., via a microprocessor timed to create or remove the charge at timed intervals based upon cutoff roll speed, etc.) in manners well-known to those skilled in the art.

It should be noted that the web retention device of the present invention in its various forms (described and illustrated in the preferred embodiments) can even include combinations of vacuum retention and electrostatic retention, such as by controllably

electrostatically charging one or more of the walls 32, 34 or the throat 36 in the first preferred embodiment. These other web retention devices also act to pull and retain the severed edge of a web closely beside its cut location on a cutoff roll (for example), and fall within the spirit and scope of the present invention.

The embodiments of the present invention described above and illustrated in the drawings each disclose a web retention device 40, 140 located behind the cutoff blade 20, 120. However, it should be noted that the web retention device 40, 140 (the aperture 30, 130 and its related elements) can be located in front of the cutoff blade 20, 120 in order to hold the trailing web edge 28, 128 of the web 10, 110 to the cutoff roll 14, 114. Such alternate embodiments function in substantially the same manner as the embodiments described above. In yet another alternate embodiment, the cutoff roll 14, 114 can even be provided with a web retention device 40, 140 located behind the cutoff blade 20, 120 and a web retention device 40, 140 located in front of the cutoff blade 20, 120. By providing apertures 30, 130 on either side of the cutoff blade 20, 120, both the leading and trailing web edges 26, 126, 28, 128 can be held securely to the cutoff roll 14, 114.

The embodiments described above and illustrated in the figures are presented by way of example only and are not intended as a limitation upon the concepts and principles of the present invention. As such, it will be appreciated by one having ordinary skill in the art that various changes in the elements and their configuration and arrangement are possible without departing from the spirit and scope of the present invention as set forth in the appended claims.

For example, the embodiments described above and illustrated in the figures show the web retention device 40, 140 located behind or in front of a cutoff blade 20, 120 on a cutoff roll 14, 114. However, one having ordinary skill in the art will

recognize that the aperture 30, 130 and blade 20, 120 arrangement of the present invention can be employed with the same advantageous results to any system or device in which the leading and/or trailing edges of a cut web 10, 110 are left after being cut. The blade 20, 120 and the aperture 30, 130 need not necessarily be on a roll or a curved surface, but can instead be located on a table or any other surface on top of over which a web 10, 110 is placed to be cut. (In such cases, the "surface" can be interrupted by the blade(s) and aperture(s)). The advantages of the present invention are, however, realized most particularly in applications where the surface is in motion or is moved, and/or in which it is desirable to hold the severed web 10, 110 in place to prevent web piling up or motion beside the blade. Also, although the appended claims, the description, and the figures of the preferred embodiments disclose or make reference to a particular orientation of the web 10, 110, the cutoff roll 14, 114 and the web retention devices 40, 140, it is to be understood that this orientation is not to be considered a limitation upon the spirit and scope of the present invention. For example, the cutoff roll 14, 114 is disclosed and claimed herein as being located beneath the web 10, 110. It will be appreciated by one having ordinary skill in the art that the present invention can be employed with many other web/retention device/cutoff roll orientations, and that reference in the claims to a particular orientation (e.g., "beneath", "underlying", etc.) in fact includes all web-to-surface orientations which are adjacent one another.

Also, the present invention is described and illustrated as performing web retention operations upon edges 26, 28, 126, 128 of a severed web 10, 110. However, it should be noted that the present invention can operate upon a portion of the severed web 10, 110 which is located a distance from the edges 26, 28, 126, 128 of the severed web 10, 100. For example, in the first preferred embodiment of the present invention described above and illustrated in Figure 2, the aperture 30 is located immediately

behind the cutoff blade 20. However, depending at least in part upon the dimensions and size of the cutoff roll 14, the cutoff blade 20, and the web 10, it is possible that the leading web edge 26 of the severed web 10 is not pulled into the aperture 30. A portion of the severed web 10 behind the leading web edge 26 can instead be pulled into the aperture and held therein by the vacuum force. Though the result of such an action is still the same (the severed leading web edge 26 is held closely to the surface of the cutoff roll 14 to prevent piling up in downstream operations), the web edge 26 itself need not necessarily be pulled into the aperture 30 for the present invention to operate correctly. Any portion of the severed web located closely behind the cutoff blade 20 can be retained within the aperture 30 to still practice the present invention. Of course, this is also true for embodiments of the present invention in which the trailing severed web edge 28 is held within an aperture in the cutoff roll 14, and is true for the alternative embodiments of the present invention described herein. As such, reference in this application to the term "edge" (particularly with reference to retaining an edge of the web within an aperture 30, 130) is not limited to the physical edge of a web, but instead means any portion of the web which is retained within an aperture following the principles of the present invention.

Additionally, the particular system in which the present invention is illustrated and described above (a cutoff roll 14, 114 and a stationary anvil 16, 116 and anvil blade 18, 118) is to be considered only an example of the many systems and devices in which the present invention can be employed. For example, the present invention can be utilized with systems having a rotating anvil 16, 116 and anvil blade 18, 118 or with systems having a stationary cutoff roll 14, 114 and a moving anvil 16, 116 and anvil blade 18, 118, or even with systems having web severing elements or devices well-known to those skilled in the art but which are completely different than those disclosed

herein. In this regard, it is to be noted that the cutoff blade 20, 120 need not necessarily be mounted or attached to the surface (or with respect to the surface) on which the web retention devices 40, 140 are located. Specifically, the blade 20, 120 and web retention devices 40, 140 illustrated in the figures are shown fixed in place relative to one another. However, a number of other conventional cutting elements and systems can be used with equal effect to sever the web 10, 110 in a place near the aperture 30, 130 (allowing the aperture 30, 130 to pull and hold the severed web 10, 110). One example of an alternate cutting element is a blade mounted upon an arm which reciprocates to bring the blade into and out of contact with the passing web 10, 110. Many cutting arrangements do not physically separate the severed edges of the web 10, 110 with a barrier, such as the cutoff blade 20, 120 in the preferred embodiments described above. In such cases, it is possible to pull both the leading and trailing edges 26, 126, 28, 128 into the same aperture 30, 130.

Finally, it will be appreciated by one having ordinary skill in the art that the aperture 30, 130 used in the present invention can vary in shape and size while still accomplishing the purposes of the invention. As noted above, the dimensions and arrangement of the throat 36, 136 and aperture walls 32, 132, 34, 140 of the aperture 30, 130 can vary considerably, as can the particular orientation of the aperture 30, 130 with respect to the cutoff blade 20, 120. It should also be noted that the overall length and shape of the aperture 30, 130 can vary significantly. Specifically, the aperture 30, 130 need not necessarily run the entire length of the roll 14, 114, or even the entire length of the blade 20, 120. Because the web material used is often somewhat elastic, an elongated aperture 30, 130 can be shorter in length than the blade 20, 120 but still be able to pull (by vacuum) a significant length of the web edge therein to hold the web 10, 110 against the roll 14, 114. In this regard, it is thus possible to have a cutoff roll 14,

114 with more than one elongated aperture 30, 130 behind or in front of the cutoff blade 20, 120. For example, a line of elongated apertures 30, 130 can be arranged in an end-to-end fashion behind the cutoff blade 20, 120, rather than having one long aperture running behind the cutoff blade 20, 120.

Having thus described the invention, what is claimed is:

1. An apparatus for retaining a web of material with respect to a blade, comprising:

a surface having an aperture defined therein, the aperture adapted to receive therein and retain a portion of the web severed by the blade, the aperture being located beneath the portion of the web severed by the blade;

the aperture being in fluid communication with a vacuum source to exert a suction force through the aperture and upon the portion of the web.

2. The apparatus as claimed in claim 1, wherein the portion of the web is an edge portion of the web.

3. The apparatus as claimed in claim 1, wherein the surface is in fixed relationship with the blade.

4. The apparatus as claimed in claim 1, wherein the surface is a curved surface of a rotatable cutoff roll.

5. The apparatus as claimed in claim 4, wherein the blade is mounted to the cutoff roll.

6. The apparatus as claimed in claim 5, wherein the aperture is located behind the blade with respect to rotation of the cutoff roll.

7. The apparatus as claimed in claim 5, wherein the aperture is located in front of the blade with respect to rotation of the cutoff roll.

8. The apparatus as claimed in claim 7, further comprising a second aperture defined in the surface and located behind the blade with respect to rotation of the cutoff roll, the second aperture adapted to receive therein a second portion of the web severed by the blade, the vacuum source also being in fluid communication with the second aperture to exert a suction force through the second aperture and upon the second portion of the web.

9. The apparatus as claimed in claim 1, wherein the aperture is in the shape of an uninterrupted elongated groove capable of receiving a length of the portion of the web severed by the blade.

10. The apparatus as claimed in claim 1, wherein the aperture has walls defining a throat extending below the surface, the portion of the web being retained in the throat by the suction force generated by the vacuum source.

11. The apparatus as claimed in claim 10, wherein the aperture has at least two opposing walls between which the portion of the web is retained by the suction force generated by the vacuum source.

12. The apparatus as claimed in claim 10, wherein one of the walls comprises a surface of the blade.

13. A vacuum apparatus for securing a web severed by a blade, comprising:

a surface underlying the web, the surface having an aperture defined therein into which a portion of the web severed by the blade is received; and

a vacuum source coupled to the aperture to exert a suction force through the aperture and a pulling force upon the portion of the web.

14. The vacuum apparatus as claimed in claim 13, wherein the portion of the web is an edge of the web.

15. The vacuum apparatus as claimed in claim 13, wherein the blade and the surface are in fixed positional relationship with respect to one another.

16. The vacuum apparatus as claimed in claim 15, wherein the surface is an external surface of a rotatably-mounted cutoff roll.

17. The vacuum apparatus as claimed in claim 16, wherein the blade is mounted to the cutoff roll.

18. The vacuum apparatus as claimed in claim 17, wherein the blade is located in front of the aperture with respect to rotation of the cutoff roll.

19. The vacuum apparatus as claimed in claim 17, wherein the blade is located behind the aperture with respect to rotation of the cutoff roll.

20. The vacuum apparatus as claimed in claim 19, further comprising a second aperture located behind the blade with respect to rotation of the cutoff roll, the vacuum source being coupled to the second aperture to exert a suction force therethrough and a pulling force upon a second portion of the web received within the second aperture.

21. The vacuum apparatus as claimed in claim 13, wherein the aperture is an elongated groove of sufficient length to receive a length of the portion of the web severed by the blade.

22. The vacuum apparatus as claimed in claim 13, wherein the aperture has at least one wall defining a throat of the aperture extending below the surface and into which the web severed by the blade is received.

23. The vacuum apparatus as claimed in claim 22, wherein the aperture has at least two opposing walls at least partially defining the throat and between which the web severed by the blade is received.

24. The vacuum apparatus as claimed in claim 22, wherein one wall of the throat is defined at least in part by a surface of the blade.

25. An apparatus for holding a web of material with respect to a blade, comprising:

a surface;

a blade mounted with respect to the surface;

an aperture located in the surface immediately beside the blade and beneath a portion of the web severed by the blade; and

a vacuum generator coupled to the aperture to exert an attractive force upon the portion of the web.

26. A method for holding a web of material severed by a blade, comprising:

severing the web with the blade to produce a severed web portion;

providing a surface having an aperture defined therein, the aperture adapted to receive therein the severed web portion;

pulling the severed web portion into the aperture; and retaining the severed web portion within the aperture.

27. The method as claimed in claim 26, wherein the severed web portion is pulled into and retained within the aperture by a suction force created through the aperture.

28. The method as claimed in claim 27, wherein the suction force is created by a vacuum source in fluid communication with the aperture.

29. The method as claimed in claim 26, wherein the surface is a surface of a cutoff roll.

30. The method as claimed in claim 29, wherein the blade is located on the cutoff roll, the method further comprising the step of rotating the cutoff roll, the aperture being located behind the blade with respect to rotation of the cutoff roll.

31. The method as claimed in claim 26, wherein the aperture is elongated in shape and has a length sufficient to receive a length of the severed web portion therein.

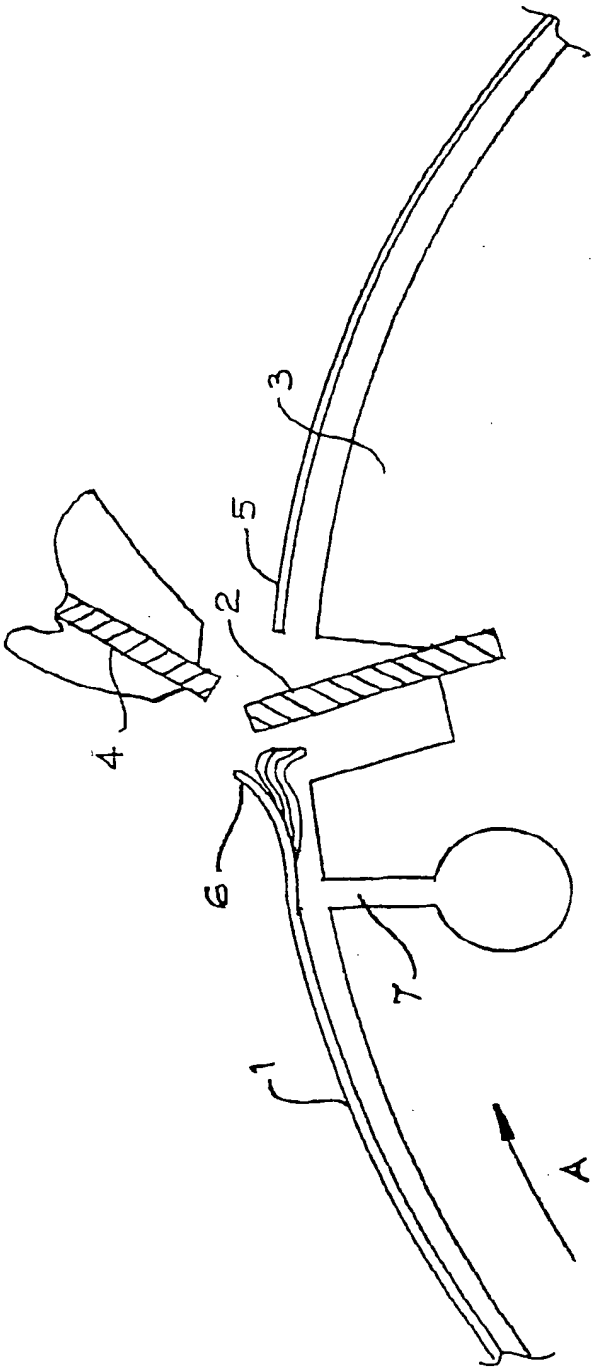

Fig. 1

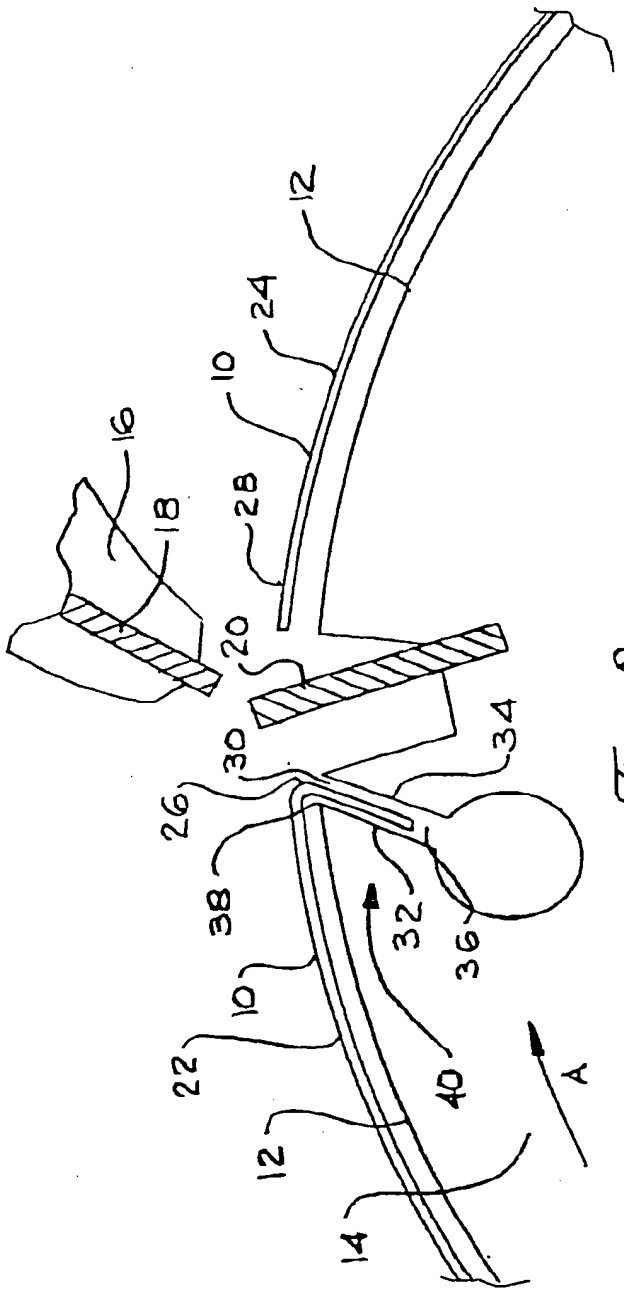

Fig. 2

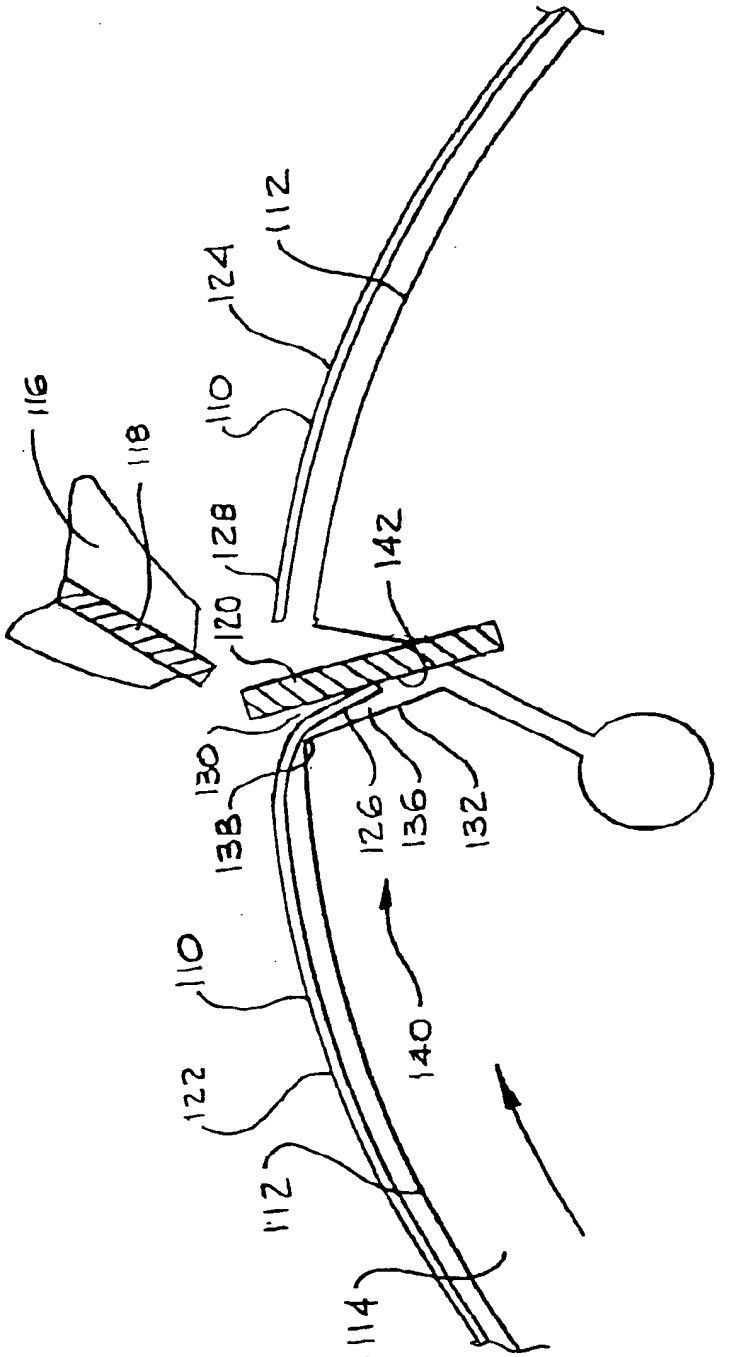
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Fig. 3